

**ABSTRACT OF THE DISCLOSURE**

An apparatus and method to enhance the overall performance of mechanical seals in one of the following ways: by reducing seal face wear, by reducing the contact surface temperature, or by increasing the life span of mechanical seals. The apparatus is a mechanical seal (e.g., single mechanical seals, double mechanical seals, tandem mechanical seals, bellows, pusher mechanical seals, and all types of rotating and reciprocating machines) comprising a rotating ring and a double-tier mating ring. In a preferred embodiment, the double-tier mating ring comprises a first and a second stationary ring that together form an agitation-inducing, guided flow channel to allow for the removal of heat generated at the seal face of the mating ring by channeling a coolant entering the mating ring to a position adjacent to and in close proximity with the interior surface area of the seal face of the mating ring.